

PACKAGE FOR A DIGITAL RECORDING SUPPORT IN THE FORM OF A DISK

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[0001] The present invention relates to the area of packages for digital recording supports in the form of a disk such as CD's, DVD's or mini CD's.

[0002] The general principle of packages comprising a centering stud on which the disk is to be clipped is known in the state of the art. The centering studs generally have several deformable petals. They are formed either by molding the bottom of a package consisting of plastic or are in the form of a piece adhered on a cardboard support.

[0003] By way of example, patent FR2810442 describes a case for DVD's, CD's or VCD's constituted by a body, a cover, a molded hinge mechanism and comprising an annular projecting element. The projecting element extends upward from the body in order to support a disk. This projecting element is formed by a protuberant collar with flexible wings that lodge in the centering hole of a disk. These petals are fragile and brittle and can break during transport or the placing or removing of the disk. The broken petals then move between the package and the disk and can scratch the disk surface.

[0004] The cost of manufacturing such a case is high because the projecting element must be molded in a complex mold with rather low manufacturing tolerances. These petals are generally sensitive to temperature and do not always ensure an effective holding of the disk.

[0005] Moreover, when the collar is adhered to the bottom of the case they can tear off and be swallowed by a child.

[0006] Patent FR 2730087 also proposes a flexible plastic case bottom presenting three pins raised vertically relative to the bottom. The disk is wedged between these pins. This solution is not very satisfactory because the disk is not correctly held. In addition, the pins rapidly wear out.

[0007] Patent US 6, 443, 300 describes a disk case comprising in particular a base with a cavity for receiving one or several disks and disk retention feet connected to this base. These feet, that extend over the peripheral parts of one or several disks arranged in the cavity and hold the disk or disks in this cavity (closed position), can be moved toward a release position in such a manner as to permit the removal of the disk or disks from this cavity.

[0008] However, such a case has disadvantages. In fact, the release of the disk or disks or requires a manual intervention directly on the retention feet, thus increasing the risk of scratching by the user when the feet are moved toward their release position. Moreover, the operation consisting of moving these feet toward their release position is not very practical. In fact, this operation requires either a successive release action on each of these feet or the use of both hands of the user for the simultaneous opening of two feet.

[0009] The present invention has the problem of proposing a new type of package that avoids the disadvantages of the devices of the prior art.

[0010] To this end the invention relates according to its most general meaning to a package for a digital recording support in the form of a disk formed by a plate with means for centering this disk, characterized in that the plate comprises at least two radial shoulders arranged on both sides of a median line for positioning the disk, which radial shoulders are defined so as to cover when at rest a marginal zone of the disk and to define with the bottom of the plate a slot with a height approximately equal to the disk thickness.

[0011] The plate preferably has a cylindrical cavity for receiving a disk, which cavity advantageously has a diameter slightly greater than the diameter of said disk and preferably on the order of 4 to 5%.

[0012] According to a variant the cavity has an oval or ellipsoidal shape with a small axis corresponding approximately to the diameter of the disk to be inserted on the plate and a large axis slightly greater than the diameter of said disk, which term “slightly” means that the dimensional difference is sufficient to permit a movement along the large axis in order to permit an insertion into the cavity while ensuring the hold by the radial shoulders when the disk is at rest in the position of insertion into the cavity.

[0013] This cylindrical cavity advantageously has a depth on an annular peripheral band that corresponds approximately to the disk thickness.

[0014] According to an embodiment of the invention the plate has at least one elastically deformable stop preferentially arranged on the periphery of the cavity.

[0015] It is advantageous if at least one of the stops is arranged at the level of one of the slots formed by one of the shoulders and the bottom of this plate. According to a particular configuration of the invention at least one of the stops is supported by one of the shoulders.

[0016] It is advantageous if at least one of the stops comprises at least one foot with approximately rectangular dimensions and preferably with a slightly decreasing width between its ends and its central part.

[0017] This foot advantageously has a convex shape directed toward said cylindrical cavity.

[0018] According to a variant this cylindrical cavity is prolonged from the side opposite one of said shoulders by a prehension zone forming a hollow emptying into said cavity.

[0019] According to a particular embodiment one of the shoulders covers a zone of this cavity, the dimension of which zone is less than 5% of the diameter of the disk.

[0020] One of the shoulders is advantageously formed by a radial prolongation covering part of the cavity over a distance less than 5% of the diameter of the disk.

**[0021]** According to another variant one of the shoulders is constituted by a rocking element with a flange with a thickness corresponding to the thickness of the disk, which element can be moved between a position in which it holds the disk in the cavity and a position in which it releases this disk.

**[0022]** According to another embodiment one of the shoulders has an elastically deformable bottom during the insertion phase of the disk.

**[0023]** According to an advantageous embodiment of the invention the package also comprises at least one second plate for housing at least one second disk, which second plate has at least two radial shoulders defined so as to cover at rest a marginal zone of this disk and to define with the bottom of the plate a slot with a height approximately equal to the disk thickness. These shoulders are configured in such a manner as to allow the introduction and the withdrawal of the disk by elastic deformation of a part of said plate.

**[0024]** This second plate advantageously covers at least a part of said plate. This second plate preferably covers 50% of the plate cavity.

**[0025]** The invention will be better understood from a reading of the following description, that refers to the attached drawings concerning non-limiting exemplary embodiments in which:

Figure 1 shows a top view onto a first exemplary embodiment of the package in accordance with the invention.

Figure 2 shows a section AA of this package.

Figure 3 shows a section of a variant of an embodiment of this package.

Figure 4 shows a top view onto a variant of an embodiment.

Figure 5 shows a section of this variant.

Figure 6 shows a top view onto another variant of an embodiment.

Figure 7 shows a top view onto another variant of an embodiment.

Figures 8 to 10 show detailed views along sectional planes BB, CC and DD respectively.

Figure 11 shows a perspective view of another exemplary embodiment of a package for two digital recording supports.

Figure 12 shows a top view onto the package of figure 11.

Figures 13 to 15 respectively show a front view in perspective, a rear view in perspective and a top view of another exemplary embodiment for two digital recording supports.

Figure 16 shows a perspective view of the package of figures 13 to 15 in which the digital recording supports are arranged in this package.

[0026] Figures 1, 2 and 3 respectively show a top view and a section of an exemplary embodiment of the invention and a section of a variant of an embodiment of the invention.

[0027] The package is constituted by a plate 1 with a housing with an approximately cylindrical shape for receiving a disk 3.

[0028] Plate 1 is realized from plastic or any other material. It has a thickness greater than the thickness of disk 3. The housing is formed by cavity 2 with an annular border and central island 15. It is prolonged by prehension zone 8 with a width of approximately 20 mm that allows the edge of the disk 3 to be grasped by a finger.

[0029] The package has three shoulders 4 to 6 arranged on both sides of transversal median line 7.

[0030] Shoulder 4 is arranged transversally and extends out in order to cover a peripheral zone of cavity 2.

[0031] The two shoulders 5, 6 are arranged symmetrically on both sides of prehension zone 8. The upper surface has a bevel that facilitates the introduction of the disk.

[0032] They also cover a peripheral zone of cavity 2. Shoulders 4 to 6 cover the cavity over one to two millimeters in order to ensure an effective hold when disk 3 is in position and to ensure an easy insertion and removal by elastic deformation of part of plate 1.

[0033] In a preferred embodiment of the invention the deformable part of this plate 1 consists of an element forming a stop. This stop is advantageously a foot 16 with a convex shape and a width that slightly decreases between its ends and its central part.

[0034] This foot 16, fixed to plate 1 at the level of its ends, is arranged in the slot formed by said shoulder 4 and the bottom of plate 1 in such a manner as to constitute a stop that deforms during the introduction and the removal of disk 3 and reassumes its initial shape once disk 3 is inserted or removed from said cavity 2.

[0035] In this embodiment the feet and plate 1 are constituted of plastic.

[0036] Figures 4, 5 show a variant of an embodiment.

[0037] Plate 1 comprises transversal shoulder 4 and, on the diametrically opposite side, locking element 9 with flange 10 whose height corresponds approximately to the thickness of disk 3.

[0038] Locking element 9 is pivotably mounted, e.g., by elastic deformation of a zone with a peripheral cutout and a non-cutout zone forming a hinge.

[0039] It is prolonged by lever 12 that allows the rocking during the insertion or the removal of disk 3.

[0040] The locking element has lower part 13 with a length less than upper part 12 of which the upper part is biased.

[0041] Figure 6 shows a top view of a variant of an embodiment. The plate has a housing 2 whose length, measured along an axis passing through cavity 8, is greater than the nominal

section of the disk intended to be housed in this housing. This housing can have a circular shape with a diameter slightly greater than the nominal diameter of a disk or can also have an oval shape with a width corresponding approximately to the diameter of a disk and a length greater than the diameter of the disk. The difference between the diameter of the disk and the length of the housing is sufficient for permitting the engagement of the disk into the housing but reduced in order to permit a holding by shoulders 4, 5, 6.

[0042] Housing 2 receiving the disk comprises prolongation 8 for the passage of a finger. The plate comprises two lugs 5, 6 on both sides of this cavity and extending slightly above the housing in which the disk is housed by several millimeters. These lugs 5, 6 are located in the upper plane of the plate and delimit with the bottom of housing 2 a space whose height corresponds approximately to the width of a disk.

[0043] On the opposite side of the cavity the plate comprises spring leaf 16 arranged on longitudinal axis 50 passing through cavity 8. This spring leaf 16 can be realized in various shapes and even be replaced by an elastically deformable element or by a spring. In the example described, it has the shape of an arced concaved leaf penetrating at rest into the space provided for containing the disk.

[0044] It is covered by lug 4 situated in the upper plane of the plate. This lug 4 defines, like lugs 5, 6, a space whose height corresponds approximately to the height of the disk.

[0045] The imaginary circle 40 passing respectively through zones 44, 45, 46 of spurs 4, 5, 6, that are the closest to center 15 of the housing, has a section less than the nominal section of a disk intended to be positioned in housing 2. The difference between the section of this virtual circle 40 and the nominal section of a disk corresponds approximately to the radial length L of a

lug and to the amplitude of the deformation of elastic leaf 16 measured along longitudinal axis 50.

[0046] The two lugs 5,6 are arranged symmetrically on both sides of longitudinal axis 50 passing through the center of cavity 21 for the passage of a finger.

[0047] The plate is formed by molding or thermoforming a sheet of plastic. It can be adhered on a cardboard support or in a sleeve or also on the back of a book.

[0048] The disk can be introduced manually or automatically with equipment that realizes an insertion of the disk onto the plate with an initial angle of several degrees.

[0049] The introduction is performed by sliding the edge of the disk under lug 4. In order to achieve this, the disk is introduced with a slight inclination relative to the plate.

[0050] By pushing the disk against leaf 16, the disk can be made to continue sliding under lug 4, then come to rest against the bottom of housing 2.

[0051] When the disk is then released, spring leaf 16 pushes it back towards the opposite edge and the edge of the disk is then lodged under lugs 5, 6 and is stopped against peripheral edge 51 of housing 2.

[0052] The disk is then held in the housing by edges 44, 45, 46 of the three lugs 4, 5, 6.

[0053] In order to remove it from the housing a finger is engaged into cavity 8.

[0054] It is then possible to push the disk back toward spring leaf 16, which has the effect of releasing the upper edge of lugs 5, 6. A lever effect is exerted on the upper edge of the disk by the finger introduced into the cavity and it is made to assume an angle relative to the plane of the plate, which allows it to be disengaged from lugs 5, 6. The disk can then be withdrawn by sliding along longitudinal axis 50 until it is released from lower lug 4.

[0055] These movements are, of course, slight, on the order of several millimeters.



[0056] Another variant of an embodiment is described with reference made to figures 7 to 10 respectively showing a top view and sectional views on an enlarged scale.

[0057] Plate 1 is formed by molding or optionally by thermoforming a transparent plastic. It has a cavity 2 intended to receive a disk, as in the previous examples. This cavity is oval-shaped and lengthened along axis 50 passing through housing 8 for the passage of a finger.

[0058] The plate has edge 30 forming a peripheral frame. It contributes to the rigidity of the plate by limiting deformations by torsion and thus allows the thickness of plate 1 to be reduced.

[0059] It also has four zones 31 to 34 for adhering the plate onto a cardboard leaf or a case. Figure 8 shows an enlarged view in section along a plane passing through one of these adhesion zones.

[0060] Adhesion zones 31 to 34 have a hemispherical shape with a flat bottom 35 and flared peripheral edge 36 ending tangentially in the plane of upper surface 37 of plate 1.

[0061] This hemispherical shape with a flat bottom permits the realization of an adhesion with a film of transparent adhesive spreading out perfectly on the junction surface between the plate and the cardboard support and allows the visibility of information written on the cardboard support to be retained.

[0062] Shoulder 6 extends approximately 1 millimeter over perimeter 37 of the housing of disk 3. It has, viewed from above, an arced shape with chamfered edge 38.

[0063] Disk 3 is held on the edge opposite the two shoulders 5, 6 by shoulder 4 that also has, viewed from above, an arced shape. Moreover, disk 3 comes to rest against the spring leaf of elastically formed by two deformable segments 16, 16' integral with plate 1 at their ends 17, 17'. Plate 1 has a cutout 18 that releases the two segments 16, 16' and permits a deflection by flexing around fixation zone 17, 17' by elastic deformation of the two segments 16, 16'.

[0064] The plate has a cavity 8 opposite this spring leaf realized by a local reduction of the thickness of plate 1 and an optional window 19 that permits the deeper engagement of the finger under disk 3. The shape of this cavity 8 is oval. The bottom 100 of plate 1 can optionally have an opening to reduce the amount of plastic and to impart a particular aesthetic aspect.

[0065] In a particular embodiment the plate comprises foot 27 connected in a breakable manner to the plate. This breakable foot 27 covers part of cavity 8 as well as the edge of disk 3 before the first opening.

[0066] During the purchase of the product the client breaks breakable foot 27 and can then introduce his finger into cavity 8 and push disk 3 toward spring leaf 16 in order to release it from the plate. This foot can have different shapes and be connected either to a zone of cavity 8 or prolong the upper part of plate 1 in the vicinity of cavity 8.

[0067] Figure 11 shows another exemplary embodiment of a package in accordance with the invention that allows two information supports of the type like disk 3 to be packaged.

[0068] This package is constituted by a plate 1 with two support zones 1a, 1b for stacked disks. Each of support zones 1a, 1b has a housing for receiving a disk.

[0069] The housing of support zone 1a for receiving a first disk has an approximately cylindrical shape and a thickness greater than the thickness of said disk.

[0070] The housing of support zone 1a is formed by a cavity 2 with an annular edge and a central island 15. It is prolonged by prehension zone 8 that allows the edge of said first disk to be grasped with a finger.

[0071] Support zone 1a has three radial shoulders 4 to 6 covering a peripheral part of this cavity 2 on the order of one to two millimeters. Shoulders 5, 6 are advantageously arranged

symmetrically on both sides of prehension zone 8 and shoulder 4 is formed on the edge of this support zone 1a opposite this prehension zone 8.

[0072] This support zone 1a also has an elastically deformable zone consisting of an element forming a stop. This stop is advantageously formed by two convexly shaped segments 16, 16'.

[0073] Thus, as a result of this configuration the first disk is not only held effectively in said cavity 2 by said shoulders 4 to 6 but is also readily inserted and removed from this cavity 2 by virtue of said deformable segments 16, 16' constituting said support zone 1a of plate 1.

[0074] The second support zone 1b also has a housing for receiving at least part of a second disk.

[0075] The second support zone has two lateral walls 223, 225, a rear wall 224 and an upper wall 226 on which said housing for receiving the second disk is formed. This second plate 21 advantageously has a thickness greater than the thickness of the second disk.

[0076] This housing consists of a cavity 22 comprising a bottom in the form of a circle provided with cutout line 28 and an annular wall running along at least part of this bottom in such a manner that an opening 29 is formed on the front face of the second support zone 1b.

[0077] Thus, when the disk is positioned in cavity 22 of second support zone 1b, this disk presents a more or less significant part along opening 29 formed on the front face of support zone 1b extending outside of this cavity 22. The free part of the disk then allows it to be manipulated in an advantageous manner, particularly during its withdrawal from cavity 22.

[0078] Although not shown in figure 11, this cavity 22 can also have, according to a particular embodiment of the invention, a central island 215.

[0079] Just like the first support zone 1a, the second support zone 1b has three radial shoulders 24 to 26 covering a peripheral zone of said cavity 22 on the order of one to two

millimeters. Shoulders 25, 26 are advantageously arranged symmetrically on both sides of cutout line 28 and shoulder 24 is formed on the edge of support zone 1b opposite this cutout line 28.

[0080] Just like the first support zone 1a, the second support zone 1b is constituted by a deformable part consisting of two convex segments 216, 216'.

[0081] Thus, when a disk is inserted into cavity 22 of second support zone 1b, the disk exerts a pressure on these segments 216, 216' that deform under this action in order to permit the insertion of the disk into this cavity 22. The disk is then firmly held in this cavity 22 by these shoulders 24 to 26 and these segments 216, 216' that have reassumed their initial position. The removal of the disk from cavity 22 is made by pushing on the part of the disk that extends out of cavity 22 in the direction of said segments 216, 216' that deform under the action of said disk in order to permit the removal of the disk from cavity 22 of second support zone 1b.

[0082] This second support zone 1b is advantageously arranged on support zone 1a in such a manner as to partially cover this first support zone 1a and, more specifically, a part of cavity 2 of this first support zone 1a. In a preferred embodiment of the invention this second support zone 1b covers at least 50% of cavity 2 of said first support zone 1a.

[0083] On the other hand, this second support zone 1b is arranged on said first support zone 1a in such a manner that rear wall 224 and lateral walls 223, 225 correspond approximately to an extension of the rear wall and at least in part of the lateral walls of said first support zone 1a.

[0084] On the other hand, this second support zone 1b is arranged on said first support zone 1a in such manner as to allow sufficient space between the bottom of this second support zone 1b and the bottom of cavity 2 of first plate 1 for the insertion and removal of the first disk into said first support zone 1a. In fact, during the operation of inserting the disk into cavity 2 the first disk

should be able to be slid into cavity 2 of said first support zone 1a with a slight inclination. Likewise, during the removal of the disk from cavity 2 the disk should be able to be given an inclination sufficient to allow it to disengage from shoulders 5, 6 constituting said first support zone 1a.

[0085] The arrangement of the first and second support zones 1a, 1b thus makes possible the insertion and the removal of the first and second disks independently of one another. In other words, the removal (e.g.) of the first disk from cavity 2 of the first support zone 1a with a package in accordance with the invention does not require, in distinction to the packages known in the prior art, the removal of the second disk arranged in cavity 22 of second support zone 1b and inversely.

[0086] Figure 12 shows a top view of the package constituted by said plates 1, 21.

[0087] This second support zone 1b is arranged on said first support zone 1a in such a manner that said shoulders 24 to 26 are arranged in alignment with shoulders 4 to 6 respectively of said first zone 1a and that opening 29 of cavity 22 on the front face of this second support zone 1b is directed toward prehension zone 8 of said first support zone 1a.

[0088] Even though figures 11, 12 illustrate a package provided with two support zones 1a, 1b stacked for receiving two disks, it is understood that an expert in the art can conceive of packages comprising a plurality of stacked support zones arranged relative to each other in such a manner as to permit the packaging of a plurality of disks without departing from the scope of the present invention.

[0089] Figures 13 to 15 show another exemplary embodiment of a package for two digital recording supports of the disk type.

[0090] The package is constituted by plate 1 with two housings, a lower housing and an upper housing, each for receiving a disk. By virtue of this fact, this plate 1 has a thickness greater than the thickness of two disks.

[0091] The lower housing is advantageously cylindrical in order to receive a first disk. More particularly, this lower housing consists of cavity 2 with an annular edge and central island 15.

[0092] As described above, cavity 2 comprises on its periphery radial shoulders 4 to 6 and segments 16, 16' forming an elastically deformable stop element.

[0093] As for the upper housing, it consists of cavity 21 in the form of a crescent moon provided on its external periphery with edge 220 and whose ends 221, 222 extend above this lower cavity 2.

[0094] Thus, when the second disk is positioned in upper cavity 22, this disk presents a part extending above lower cavity 2, or, when the package comprises the two disks, above the lower disk as illustrated in figure 16. Just as for lower cavity 2, this upper cavity 22 comprises on its periphery radial shoulders 24 to 26 and segments 216, 216' forming an elastically deformable stop element.

[0095] Just as described above, it is understood that an expert in the art can conceive of packages comprising a plurality of cavities arranged relative to each other in such a manner as to permit the packaging of a plurality of disks without departing from the scope of the present invention.

[0096] The invention was described above by way of example. It is understood that an expert in the art is capable of realizing different variants of the invention without departing from the framework of the patent.